AL.3.3008-306

University of Alberta Library
0 1620 3452397 5

...udent and teacher: Use this cover sheet for mailing or faxing.

ASSIGNMENT BOOKLET 4A

MAT3037 Pure Mathematics 30
Module 4: Section 1 Assignment

FOR STUDENT USE ONLY	
Date Assignment Submitted: _____	(If label is missing or incorrect)
Time Spent on Assignment: _____	Student File Number: _____
	Module Number: _____

FOR OFFICE USE ONLY

Assigned Teacher: _____

Assignment Grading: _____

Graded by: _____

Date Assignment Received:

Student's Questions and Comments

Apply Module Label Here

Name

Address

Postal Code

Please verify that preprinted label is for correct course and module.

Teacher's Comments

_____
Teacher

INSTRUCTIONS FOR SUBMITTING THIS DISTANCE LEARNING ASSIGNMENT BOOKLET

When you are registered for distance learning courses, you are expected to regularly submit completed assignments for correction. Try to submit each Assignment Booklet as soon as you complete it. Do not submit more than one Assignment Booklet in one subject at the same time. Before submitting your Assignment Booklet, please check the following:

- Are all the assignments completed? If not, explain why.
- Has your work been reread to ensure accuracy in spelling and details?
- Is the booklet cover filled out and the correct module label attached?

MAILING

1. Do **not** enclose letters with your Assignment Booklets. **Send all letters in a separate envelope.**

2. Put your Assignment Booklet in an envelope and take it to the post office and have it weighed. Attach **sufficient postage** and seal the envelope.

FAXING

1. Assignment Booklets may be faxed to the school with which you are registered. Contact your teacher for the appropriate fax number.

2. All faxing costs are the responsibility of the sender.

E-MAILING

It may be possible to e-mail your completed Assignment Booklet to the school with which you are registered. You also may be **required** to e-mail some of your assignments. Contact your teacher for the appropriate e-mail address.

Pure MATHEMATICS 30

Module 4

Conics

Assignment Booklet 4A

Learning Technologies Branch

Alberta EDUCATION

FOR TEACHER'S USE ONLY

Summary

	Total Possible Marks	Your Mark
Section 1 Assignment	45	

Teacher's Comments

Pure Mathematics 30
Module 4: Conics
Assignment Booklet 4A
Section 1 Assignment
Learning Technologies Branch
ISBN 0-7741-2805-4

The Learning Technologies Branch acknowledges with appreciation the Alberta Distance Learning Centre and Pembina Hills Regional Division No. 7 for their review of this Assignment Booklet.

This document is intended for	
Students	✓
Teachers	✓
Administrators	
Home Instructors	
General Public	
Other	

You may find the following Internet sites useful:

- Alberta Education, **http://www.education.gov.ab.ca**
- Learning Technologies Branch, **http://www.education.gov.ab.ca/ltb**
- Learning Resources Centre, **http://www.lrc.education.gov.ab.ca**

Exploring the electronic information superhighway can be educational and entertaining. However, be aware that these computer networks are not censored. Students may unintentionally or purposely find articles on the Internet that may be offensive or inappropriate. As well, the sources of information are not always cited and the content may not be accurate. Therefore, students may wish to confirm facts with a second source.

Copyright © 2006, Alberta Education. This resource is owned by the Crown in Right of Alberta, as represented by the Minister of Education, Alberta Education, 10155 – 102 Street, Edmonton, Alberta, Canada T5J 4L5. All rights reserved.

This courseware was developed by or for Alberta Education. Third-party content has been identified by a © symbol and/or a credit to the source and must be used as is. This courseware may be reproduced in any form, including photocopying, without the written permission of Alberta Education. Changes can be made only to content owned by Alberta Education. For more detailed information, refer to the Terms of Use Agreement. Every effort has been made to acknowledge the original source and to comply with Canadian copyright law. If cases are identified where this effort has been unsuccessful, please notify Alberta Education so corrective action can be taken.

THIS COURSEWARE IS NOT SUBJECT TO THE TERMS OF A LICENCE FROM A COLLECTIVE OR LICENSING BODY, SUCH AS ACCESS COPYRIGHT.

UNIVERSITY LIBRARY
UNIVERSITY OF ALBERTA

ASSIGNMENT BOOKLET 4A
PURE MATHEMATICS 30: MODULE 4
SECTION 1 ASSIGNMENT

This Assignment Booklet is worth 45 marks out of the total 100 marks for the assignments in Module 4. The value of each assignment and each question is stated in the left margin.

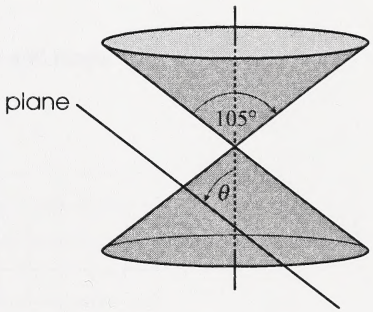
Read all parts of your assignment carefully and record your answers in the appropriate places. If you have difficulty with an assignment, go back to your Student Module Booklet and review the appropriate activity. Be sure to proofread your answers carefully before submitting your Assignment Booklet.

(45)

Section 1 Assignment: Exponential Functions

Clearly show how you arrived at your answers by showing your work.

1. The vertex angle of a double-napped cone is 105°. The angle θ is the angle measured from the axis to the cutting plane (as shown in the diagram). For what angle θ, or range of values for θ, does the cutting plane need to intersect the conical surface in order to generate each of the following conics?



(1) **a.** a circle

(1) **b.** a parabola

(1) **c.** an ellipse

(1) **d.** a hyperbola

(3)

2. A degenerate form of the hyperbola is a pair of intersecting lines. Explain how you must position an intersecting plane to intersect the cone described in question 1 to obtain a degenerate hyperbola.

(4)

3. Which degenerate form or forms of the parabola cannot be obtained from the intersection of a plane and a double-napped cone? Describe how to obtain this (or these) form(s). Use a diagram to support your answer.

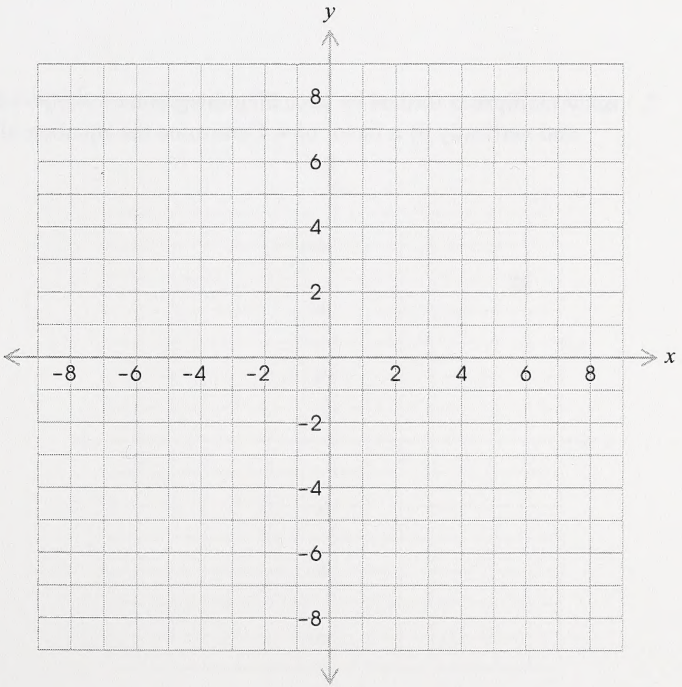
(4)

4. A unit circle centred at the origin undergoes a series of transformations. The equation of the resulting graph is $(x-3)^2+(y+4)^2=25$. Describe the transformations the unit circle underwent.

5. Use $x^2 + y^2 - 6x + 8y + 9 = 0$ to do the following.

(3) **a.** Write the equation in standard form.

(4) **b.** Draw the graph of this equation, and state the domain and range.



(4)

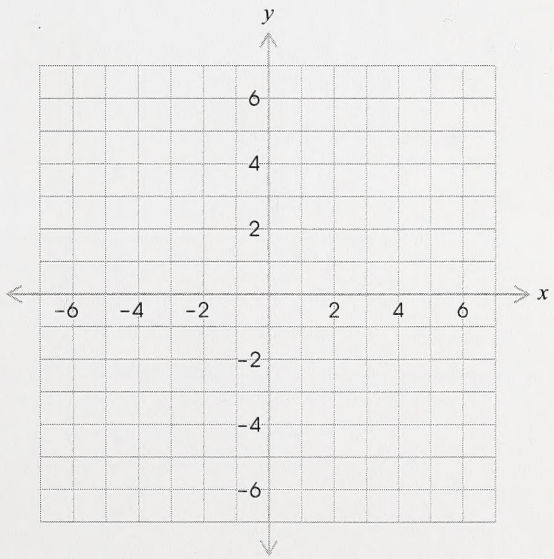
6. Determine the standard form of the equation of a circle with centre at $(4, -1)$ and passing through $(0, 2)$.

(3)

7. a. An ellipse is formed by stretching the graph of $x^2 + y^2 = 1$ horizontally by a factor of 3 and vertically by a factor of 4. Determine the equation of this ellipse in standard form.

(4) **b.** The ellipse in question 7.a. is translated 4 units to the right and 2 units down. Determine the equation of this ellipse. Express your answer in both standard form and general form.

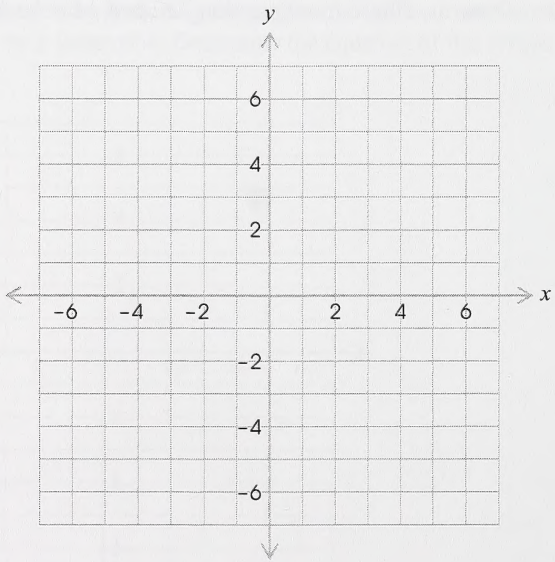
(4) **c.** Draw the ellipse from question 7.b., and state the domain and range.



8. Use $9x^2 + 4y^2 + 18x - 16y - 11 = 0$ to do the following.

(4) **a.** Write the equation in standard form.

(4) **b.** Draw the curve, and state the domain and range.



© 2006

Student and teacher: Use this cover sheet for mailing or faxing.

ASSIGNMENT BOOKLET 4B

MAT3037 Pure Mathematics 30
Module 4: Section 2 Assignment and Final Module Assignment

FOR STUDENT USE ONLY	
Date Assignment Submitted: _____	(If label is missing or incorrect)
Time Spent on Assignment: _____	Student File Number: _____
	Module Number: _____

FOR OFFICE USE ONLY

Assigned Teacher: _____

Assignment Grading: _____

Graded by: _____

Date Assignment Received:

Student's Questions and Comments

Apply Module Label Here

Name

Address

Postal Code

Please verify that preprinted label is for correct course and module.

Teacher's Comments

_____
Teacher

INSTRUCTIONS FOR SUBMITTING THIS DISTANCE LEARNING ASSIGNMENT BOOKLET

When you are registered for distance learning courses, you are expected to regularly submit completed assignments for correction. Try to submit each Assignment Booklet as soon as you complete it. Do not submit more than one Assignment Booklet in one subject at the same time. Before submitting your Assignment Booklet, please check the following:

- Are all the assignments completed? If not, explain why.
- Has your work been reread to ensure accuracy in spelling and details?
- Is the booklet cover filled out and the correct module label attached?

MAILING

1. Do **not** enclose letters with your Assignment Booklets. **Send all letters in a separate envelope.**

2. Put your Assignment Booklet in an envelope and take it to the post office and have it weighed. Attach **sufficient postage** and seal the envelope.

FAXING

1. Assignment Booklets may be faxed to the school with which you are registered. Contact your teacher for the appropriate fax number.

2. All faxing costs are the responsibility of the sender.

E-MAILING

It may be possible to e-mail your completed Assignment Booklet to the school with which you are registered. You also may be **required** to e-mail some of your assignments. Contact your teacher for the appropriate e-mail address.

Pure MATHEMATICS 30

Module 4

Conics

Assignment Booklet 4B

Learning Technologies Branch

Alberta EDUCATION

FOR TEACHER'S USE ONLY

Summary

	Total Possible Marks	Your Mark
Section 2 Assignment	40	
Final Module Assignment	15	

Teacher's Comments

Pure Mathematics 30
Module 4: Conics
Assignment Booklet 4B
Section 2 Assignment
Learning Technologies Branch
ISBN 0-7741-2806-2

The Learning Technologies Branch acknowledges with appreciation the Alberta Distance Learning Centre and Pembina Hills Regional Division No. 7 for their review of this Assignment Booklet.

This document is intended for	
Students	✓
Teachers	✓
Administrators	
Home Instructors	
General Public	
Other	

You may find the following Internet sites useful:

- Alberta Education, **http://www.education.gov.ab.ca**
- Learning Technologies Branch, **http://www.education.gov.ab.ca/ltb**
- Learning Resources Centre, **http://www.lrc.education.gov.ab.ca**

Exploring the electronic information superhighway can be educational and entertaining. However, be aware that these computer networks are not censored. Students may unintentionally or purposely find articles on the Internet that may be offensive or inappropriate. As well, the sources of information are not always cited and the content may not be accurate. Therefore, students may wish to confirm facts with a second source.

Copyright © 2006, Alberta Education. This resource is owned by the Crown in Right of Alberta, as represented by the Minister of Education, Alberta Education, 10155 – 102 Street, Edmonton, Alberta, Canada T5J 4L5. All rights reserved.

This courseware was developed by or for Alberta Education. Third-party content has been identified by a © symbol and/or a credit to the source and must be used as is. This courseware may be reproduced in any form, including photocopying, without the written permission of Alberta Education. Changes can be made only to content owned by Alberta Education. For more detailed information, refer to the Terms of Use Agreement. Every effort has been made to acknowledge the original source and to comply with Canadian copyright law. If cases are identified where this effort has been unsuccessful, please notify Alberta Education so corrective action can be taken.

THIS COURSEWARE IS NOT SUBJECT TO THE TERMS OF A LICENCE FROM A COLLECTIVE OR LICENSING BODY, SUCH AS ACCESS COPYRIGHT.

ASSIGNMENT BOOKLET 4B
PURE MATHEMATICS 30: MODULE 4
SECTION 2 ASSIGNMENT AND FINAL MODULE ASSIGNMENT

This Assignment Booklet is worth 55 marks out of the total 100 marks for the assignments in Module 4. The value of each assignment and each question is stated in the left margin.

Read all parts of your assignment carefully and record your answers in the appropriate places. If you have difficulty with an assignment, go back to your Student Module Booklet and review the appropriate activity. Be sure to proofread your answers carefully before submitting your Assignment Booklet.

40

Section 2 Assignment: Hyperbolas and Parabolas

Clearly show how you arrived at your answers by showing your work.

(2)

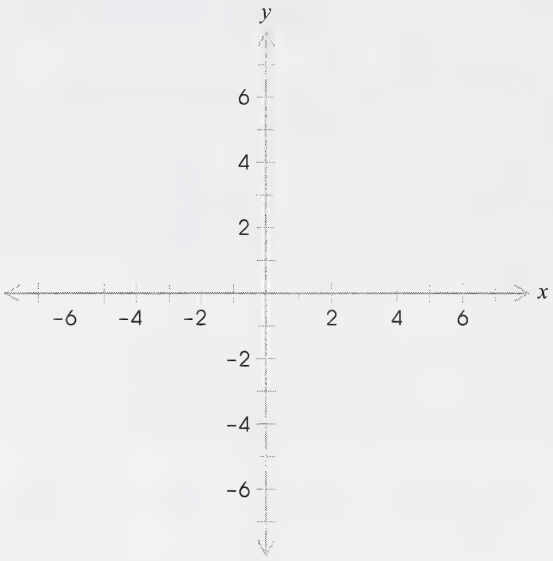
1. a. Describe the transformations necessary to obtain the graph of $\frac{y^2}{16} - \frac{x^2}{4} = 1$ from the graph of $y^2 - x^2 = 1$.

(2)

b. What are the slopes of the asymptotes of $\frac{y^2}{16} - \frac{x^2}{4} = 1$?

(4)

c. Sketch the graph of $\frac{y^2}{16} - \frac{x^2}{4} = 1$ and its asymptotes. Identify the vertices on your graph.



(3)

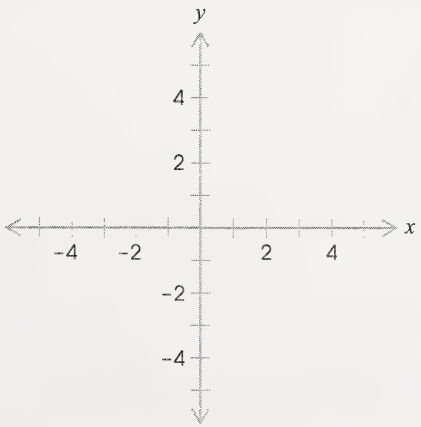
2. Determine the standard form of the equation of a hyperbola with vertices $(\pm 2, 0)$ and passing through $(4, 3)$.

3. Given $(y-2)^2 - \frac{x^2}{4} = 1$, do the following.

(2) **a.** Write the equation in general form.

(2) **b.** Locate the centre and vertices of this hyperbola.

(4) **c.** Sketch the graph of the hyperbola and its asymptotes. Label the vertices on your graph.



4. Use $4x^2 - y^2 - 8x - 4y + 16 = 0$ to do the following.

(4) **a.** Write the equation in standard form.

(3) **b.** Locate the centre and the vertices of this curve.

(2) **c.** State the domain and range of this curve.

_____

_____

(5)

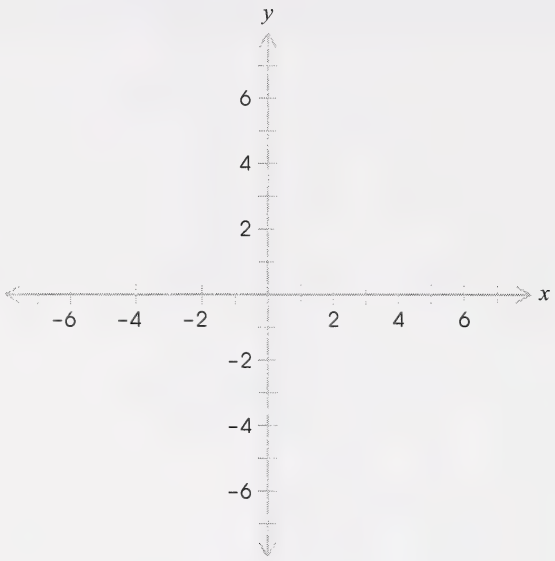
5. The graph of $y = x^2$ is reflected in the x-axis, then stretched vertically by a factor of 2, and then translated 3 units to the left and 1 unit down. What is the equation of this parabola? Write your answer in both standard form and general form.

6. Use $3y^2 - x - 12y + 14 = 0$ to do the following.

(4)

a. Write the equation in standard form.

(3) **b.** Sketch the graph. Label the vertex.



(15)

Final Module Assignment

Clearly show how you arrived at your answers by showing your work.

1. The equation $2x^2 + Cy^2 + Dx + Ey + F = 0$ represents a conic. State the value(s) of C for which each of the following are possible.

(1) **a.** a circle

_____

(1) **b.** an ellipse

_____

(1) **c.** a parabola

_____

(1) **d.** a hyperbola

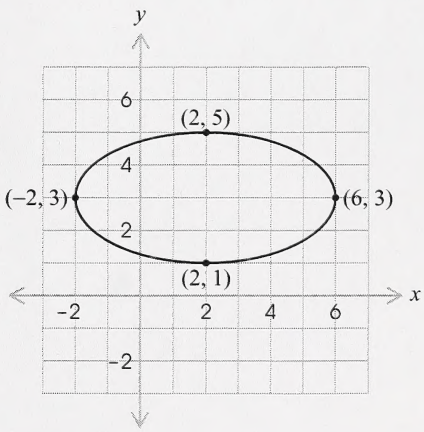
_____

(4)

2. A cylindrical tent peg is driven into level ground. Later, it is removed by pulling it straight out. Describe the possible shapes of the top of the hole left by the tent peg at the surface of the ground. Explain how each of these shapes is formed. Use diagrams if necessary.

(5)

3. Determine the equation of the following ellipse in standard form and in general form.



(2) **4.** The circle $x^2 + y^2 - 2x - 3 = 0$ is stretched horizontally by a factor of 2 about $x = 0$ to obtain an ellipse. What is the equation of this ellipse in general form?

© 2006